

REMARKS

This reply is in response to the Office Action dated April 15, 2008. Claims 1, 4, 5, 8-10, 24 and 30 to 71 are pending in the application. Claims 2, 3, 6, 7, 11-23, and 25-29 are cancelled. Claims 1, 4, 5, 8-10, 24 and 31 are withdrawn. Claims 30 and 32-63 are allowed. Claim 64-71 are rejected. Entry of the foregoing amendment and reconsideration of the claims are respectfully requested.

Withdrawn Claims

Claims 1, 4, 5, 8-10, 24 and 31 are withdrawn as being drawn to a copolymer not a process. Applicant respectfully disagrees with the Examiner. In the previous Office action dated November 7, 2007 (page 4, paragraph 7) the Examiner stated that claim 28 was allowable if rewritten in independent form. Claim 1 is that rewritten claim 28. Specifically, claim 28 stated: *The propylene copolymer of claim 23 having from 10 wt% to 20 wt% ethylene derived units, based on the total weight of the copolymer.* Claim 28 was dependent on claim 23 which stated: *The propylene copolymer of claim 21, wherein the ratio of g' is equal to or greater than 1.20.* Claim 23 was dependent on claim 21 which stated: *A propylene copolymer produced by the process of claim 1.* Finally, Claim 21 was dependent on claim 1.

The amendments to claim 1 inserted the limitations of claims 28, 23 and 21.

Specifically claim 21 was amended into claim 1 as follows:

"A propylene copolymer produced by the process A process for preparing a propylene copolymer, the processpolymerizing propylene and ethylene a comonomer selected from C₂ and C₄-C₁₀ in the..."

Claim 23 was already in claim 1 and claim 28 was amended into claim 1 as follows:

"b) from 5 wt% to about 28 wt% of the comonomer from 10 wt% to 20 wt% ethylene derived units, based on the total weight of the copolymer;...."

Thus the Applicant did *exactly* what the Examiner said was allowable. It is inconsistent and, Applicant suspects, a simple error on the Examiner's part to now penalize the Applicant and withdraw the claims, *when the Examiner indicated that they were allowable.* Claims 4, 5-8, 24

and 31 all depend on claim 1 (which is claim 28 in independent form) and thus should be allowable also.

Applicant respectfully requests that the Examiner withdraw the "withdrawal" of claims 1, 4, 5-8, 24 and 31 and pass the claims to allowance.

Claim Rejections

Claims 64-71 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,336,746 (Tsutsui). The Examiner suggests that the process and catalyst taught in Tsutsui are essentially the same as that recited in the instant claims. The Examiner then indicates that he believes that the corresponding product produced by the process of the prior art exhibits essentially the same properties and that claim 64 does not exclude terpolymers because the word "comprising" is present. Applicant respectfully disagrees, however, to further the prosecution process has amended claim 64 to delete "comprising" and insert "has." Applicant believes this clearly excludes termonomers. If the Examiner disagrees, he is requested to call Applicant's attorney so that an acceptable word choice may be agreed to.

Applicant further respectfully traverses the rejection with respect to claim 64 on grounds that Tsutsui does not teach, show or suggest the claimed invention requiring Applicant's unusual distribution of ethylene in a propylene-ethylene copolymer. At a minimum, Tsutsui does not teach, show or suggest a propylene-ethylene copolymer comprising 5-72 wt% propylene; 5-28 wt% ethylene; a ratio of g' greater than or equal to 1.10 (as determined by the claimed formula); and a weight average molecular weight of 20,000 to 1,000,000 g/mol, as required in claim 64, et seq. In the previous response (dated January 9, 2008) Applicant provided a scientific explanation to support this position and explained in detail why Tsutsui's polymers are not the same as Applicant's. That argument is reproduced below for the Examiner's convenience.

In the present invention, the effect of the comonomer addition is significant and surprising. The present invention relates to a method for preparing unique propylene polymers using a single species of metallocene catalyst that, in a single reactor, can surprisingly produce propylene copolymers having a broad composition distribution, specifically increasing comonomer content with increasing molecular weight. (See Specification at page 2, ll. 26-30.) "It is well established that molecular weight, crystallinity, and melting point decrease substantially as comonomer content increases." Specification at page 2, ll. 12-14. In other

words, it is expected to see a narrow Mw/Mn product with a narrow composition distribution. However, the present invention provides copolymers having a high weight average molecular weight (20,000 to 1,000,000 g/mol), narrow Mw/Mn and broad composition distribution ($g' \geq 1.10$) as illustrated in Figures 1 and 2. Referring to Figures 1 and 2, less comonomer (i.e. ethylene) addition was observed in the low Mw end and more comonomer (i.e. ethylene) addition was observed in the high Mw end. See, Figure 1 and page 35, line 4 through page 36, line 2. This observation was surprising. In fact, the opposite was expected because, it is expected to see a narrow Mw/Mn product with a narrow composition distribution (i.e. g' around 1.0), not a broad composition distribution. See Figures 1 and 2 where the comparative examples showed about the same comonomer addition at the low Mw end as at the high Mw end. The difference in g' from 1.0 to 1.1 is significant in both kind and degree. Accordingly, it is not obvious, inherent or otherwise expected, nor is there a reasonable basis to believe that the corresponding product produced by the process of Tsutsui exhibits essentially the same properties. Therefore, the claimed invention is not obvious in view of Tsutsui. Withdrawal of the rejection and allowance of the claims is respectfully requested.

Admittedly, Tsutsui discloses a list of various monomers and states that a mixture of two or more can be used. However, Tsutsui makes no specific reference or indicates any desirability toward propylene-ethylene copolymers having 5 wt% to about 28 wt% of the ethylene and a weight average molecular weight of 20,000 to 1,000,000 g/mol. In Example 11, Tsutsui discloses a propylene-ethylene copolymer produced from a ethylenebis-(indenyl) zirconium dichloride. When we look at example 11 a bit more closely we can glean a few important pieces of information. First the reaction had a minimal amount of ethylene present such that only 1.3 mole % was incorporated. This means that it was physically difficult for the propylene-ethylene copolymer made in example 11 to have the unique comonomer distribution that Applicant's claims require (g' ratio). Specifically there was not enough ethylene present to get an uneven distribution of more comonomer in the higher molecular weight chains. Theoretically, to do so would have required that most or all of the comonomer be inserted in the longer chains and the reactivity ratios of the two monomers (ethylene and propylene) are too close to one another for this to happen at this low an ethylene concentration in the polymerization reactor. Second, when we compare Example 11 with Example 10 (which produced propylene homopolymer) we note that there is a melting point depression from 132°C to 125°C, a 7°C difference. It is known that

there is generally a 5.5 °C depression in melting point per mole of comonomer for metallocene propylene polymers having an even distribution of comonomer among the chains. Example 11 reports the ethylene to be present at 1.3 mole%. $1.3 \text{ mol} \times 5.5 \text{ °C/mol} = 7.15 \text{ °C}$. This correlates directly with the 7°C depression expected. This is evidence that the polymer produced in example 11 does not have Applicant's uneven distribution of comonomer (which is reflected in the g' ratio ≥ 1.10 required in the claims). Thus, we can say with a level of certainty that the copolymer produced in Example 11, which is the closest to the claimed invention, does not inherently have the required product properties of Applicant's claimed invention. It is likely that the lack of substitution on the indenyl ring in Examples 10 and 11 is at least partly responsible for this difference. Note that Applicant's claim 64 requires that position 4 or 7 be substituted on the indenyl ring.

Applicant notes that Tsutsui discloses the use of substituted metallocenes, however Tsutsui does not disclose or suggest the use of substituted metallocenes to make Applicant's special copolymers. Because it is believed and shown above that a specific combination of ethylene content (5-28 wt%) and carbon-bridged substituted hafnocene are required to produce a propylene copolymer having a narrow MWD *and* broad composition distribution ($g' \geq 1.10$) and Applicant has shown example 11 does not have the required g' ratio, there is no reasonable basis to conclude that Tsutsui teaches, shows or suggests the claimed invention. Therefore, withdrawal of the rejection and allowance of the claims is respectfully requested.

Furthermore, the laundry lists of monomers and catalysts disclosed in Tsutsui, simply provides an "obvious to try" situation. An invention is merely "obvious to try" if the prior art gives either no indication of which parameters are critical or no direction as to which of many possible choices is likely to be successful. Merck & Co. Inc. v. Biocraft Laboratories Inc., 10 USPQ2d 1843 (Fed. Cir. 1989). As stated above, Tsutsui makes no indication or direction as to the comonomer content in combination with the weight average molecular weight of a propylene copolymer. Therefore, Tsutsui failed to recognize the critical parameters and cannot be used to provide a "reasonable basis" to arrive at the claimed invention. Withdrawal of the rejection and allowance of the claims is respectfully requested.

In light of the above Applicant respectfully request that the rejection under 35 U.S.C. § 103(a) over Tsutsui be withdrawn.

Allowed Claims

Applicant thanks the Examiner for allowance of Claims 30 and 32-63.

Previous Claim Rejections

Claims 1, 4, 5, 8-11, 14, 15, 18-27, 31, 32-35 were previously rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,336,746 (Tsutsui). The rejection has to have been withdrawn.

Claims 1, 4, 5, 8-11, 14, 15, 18-27, 31, 32-35 were previously rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,830,968 (Sadatoshi). The rejection appears to have been withdrawn.

Having addressed all issues set out in the office action, Applicant respectfully submits that the pending claims are now in condition for allowance. Applicant invites the Examiner to telephone the undersigned attorney if there are any issues outstanding which have not been addressed to the Examiner's satisfaction. The Commissioner is hereby authorized to charge counsel's Deposit Account No. 05-1712, for any fees, including extension of time fees and excess claim fees, required to make this response timely and acceptable to the Office.

Respectfully submitted,

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